

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1-23 and 37-46 in the reply filed on 10/7/2009 is acknowledged.

Information Disclosure Statement

2. Acknowledgement is made that the information disclosure statements filed on 6/22/2006, 8/13/2008 and 8/21/2009 have been received and considered by the examiner. If the applicant is aware of any prior art or any other co-pending applications not already of record, he/she is reminded of his/her duty under 37 CFR 1.56 to disclose the same.
3. The information disclosure statement filed 9/11/2008 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered. There appears to be a 4 page Non-Patent Literature document submitted on 9/11/2008 but it was blank.

Specification

4. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.
5. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

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Drawings

6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: Figure 2, reference number 15. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

7. Claim 23 is objected to for the following reason: Claim 1 recites a method of making a specific product and a claim to the product as set forth in claim 23 would not be a proper dependent claim if the product can be made in other ways. In the instant case, the product could be made by another lithography system without the sensors for measurement as claimed. Please refer to the MPEP 608.01(n).

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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9. **Claims 1-5,7-23 and 37-46 are rejected under 35 U.S.C. 102(b) as being anticipated by Nelson et al. (U.S. Publication No. 2002/0158185).**

10. Considering **claims 1 ad 37**, Nelson discloses a method of measurement, the method comprising:

- a. using a first sensor to measure at least one height of a first portion of a substrate (i.e., a first measurement relating to the specific region [of the wafer] using a secondary control sensor, para. 13);
- b. using a second sensor to measure at least one height of the first portion of the substrate (i.e., a second measurement relating to the specific region [of the wafer] using a primary control sensor, para. 14);
- c. generating a first characterization of an offset error of the first sensor, based on the at least one height measured using the first sensor and the at least one height measured using the second sensor (i.e., a focus distance is adjusted based on the first and second measurements, para. 14);
- d. using the first sensor to measure a plurality of heights of a second portion of a substrate (i.e., measuring another specific region, para. 64); and
- e. generating a second characterization of the second portion of a substrate, based on the first characterization and the plurality of heights of the second portion of a substrate (i.e., generating an output relating to the plurality of height maps, para. 65)

11. Considering **claim 2**, Nelson discloses (para. 75) the first portion and the second portion are of the same substrate (i.e., the measurements can be on one substrate).

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12. Considering **claim 3**, Nelson discloses (para. 75) the first portion and the second portion are portions of different substrates (i.e., the measurements can be on a few different wafers).

13. Considering **claim 4**, Nelson discloses exposing s substrate based on the second characterization (i.e., based on the height map, para. 14).

14. Considering **claim 5**, Nelson discloses prior to the exposing, storing the second characterization (i.e., exposing, measuring and then storing in the table, para. 63-64).

15. Considering **claim 7**, Nelson discloses a substrate includes controlling a position of the substrate based on the second characterization (i.e., the specific of region on the surface of the substrate is adjusted, para. 71) .

16. Considering **claim 8**, Nelson discloses the exposing a substrate includes projecting a patterned beam of radiation onto a target portion of the substrate to be exposed wherein the target portion is at least partially covered by a layer of radiation-sensitive material (i.e., projected patterned beam onto the target wherein a photoresist is deposited onto the surface of the substrate and etched to produce a patterned layer, para. 6).

17. Considering **claim 9**, Nelson discloses the second characterization includes a height map (i.e., based on the height map, para. 14).

18. Considering **claim 10**, Nelson discloses using the first sensor to measure a first plurality of heights of portions of different substrates (i.e., measuring heights on a plurality of different substrates, para. 75), using a second sensor to measure a second plurality of heights of the portions of different substrates, wherein the generating a first characterization is based on the first and second pluralities of heights (i.e., using the primary control sensor to measure the plurality of different heights and generating a corresponding measurement based up the primary and second height measurements, para. 71)

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19. Considering **claim 11**, Nelson discloses the first portion includes a plurality of subportions of a substrate (i.e., measurements are performed on each of the plurality of fields, para. 75).
20. Considering **claim 12**, Nelson discloses wherein the using of a first sensor to measure at least one height of a first portion of a substrate includes measuring a height based on at least one of an optical property of the first portion and an electrical property of the first portion (i.e., measuring various properties using capacitance gauges, optical gauges and proximity probes such as near field optical or atomic forces probes, para. 53 and 56).
21. Considering **claim 13**, Nelson discloses wherein the using of a second sensor to measure at least one height of a first portion of a substrate includes measuring a height based on at least one of an optical property of the first portion and an electrical property of the first portion (i.e., measuring various properties using capacitance gauges, optical gauges and proximity probes such as near field optical or atomic forces probes, para. 53 and 56).
22. Considering **claim 14**, Nelson discloses the first sensor is a process dependent sensor (i.e., using a capacitance gauge, para. 53).
23. Considering **claim 15**, Nelson discloses the first sensor is a process dependent sensor having a first process dependency and the second sensor is a process dependent sensor, having a second process dependency, different from the first process dependency (i.e., different process dependencies, dependent and independent, para. 53 and 56).
24. Considering **claim 16**, Nelson discloses the second sensor is a process independent sensor (i.e., air gauge, para. 56).
25. Considering **claim 17**, Nelson discloses wherein the using of a second sensor to measure at least one height of a first portion includes using at least one of an air gauge, an external profiler, and a scanning needle profiler to measure a height of the first portion (i.e., air gauge, para. 56).

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26. Considering **claim 18**, Nelson discloses wherein the using of a first sensor to measure at least one height of a first portion of a substrate includes measuring a height based on one of an optical property of the first portion and an electrical property of the first portion (control sensors use capacitance gauges to perform measurement, para. 53) and wherein the using of a second sensor to measure at least one height of a first portion of a substrate includes measuring a height based on the other of an optical property of the first portion and an electrical property of the first portion (i.e., calibration sensor uses air gauges to perform measurement, para. 56).

27. Considering **claim 19**, Nelson discloses the first characterization and the second characterization are both based on measurements performed within a predetermined part of the surface of the substrate (i.e., measurements are performed within each of the plurality fields, para. 75).

28. Considering **claim 20**, Nelson discloses a further first characterization and a further second characterization are generated both based on a measurement performed within a predetermined further part of the surface of the substrate (i.e., measurements are performed within each of the plurality fields, each field being on a different part of the surface of the substrate, para. 75).

29. Considering **claim 21**, Nelson discloses the first characterization is determined based on a measurement performed on a first portion of a substrate, the second characterization is determined based on a measurement performed on a second portion of the substrate and further characterizations are determined based on an interpolation of the first and second characterization (i.e., determining corresponding measurements between the first and second characterization, para. 71).

30. Considering **claim 22**, Nelson disclose the first characterization of an offset error is determined for a first group of substrates and a further first characterization is determined for a

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second group of substrates, based on the first characterization of the offset error for the first group of substrates and measurements performed by the first and second sensors to measure at least one height of a substrate of the second group of substrates (i.e., a focus distance is adjusted based on the first and second measurements, para. 14, and is performed on a plurality of substrates, para. 75).

31. Considering **claim 23**, Nelson discloses (para. 4) a device manufactured according to the method of claim 1.

32. Considering **claim 38**, Nelson discloses, the apparatus further comprising a patterning structure configured to pattern a beam of radiation according to a desired pattern (i.e., lithography apparatus, para. 5), a substrate table configured to hold a substrate, a projection system (i.e., projection optics system, para. 7) configured to project the patterned beam onto a target portion of a substrate held by the substrate table, wherein the apparatus is configured to position the substrate table based on the second characterization (i.e., positioning system to position the substrate table based on the height map, para. 54).

33. Considering **claim 39**, Nelson discloses a radiation system configured to provide the beam of radiation (i.e., illumination source, para. 5).

34. Considering **claim 40**, Nelson discloses the target portion is at least partially covered by a layer of radiation-sensitive material (i.e., photoresist deposited on the surface of the substrate, para. 6).

35. Considering **claim 41**, Nelson discloses the first sensor is configured to measure a height of the first portion based on at least one of an optical property of the first portion and an electrical property of the first portion (i.e., air gauge, para. 56).

36. Considering **claim 42**, Nelson discloses the second sensor is configured to measure a height of the first portion based on a property of the first portion other than an optical property and other

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than an electrical property (i.e., measuring various properties using capacitance gauges, optical gauges and proximity probes such as near field optical or atomic forces probes, para. 53 and 56).

37. Considering **claim 43**, Nelson discloses the first sensor is a process dependent sensor (i.e., using a capacitance gauge, para. 53).

38. Considering **claim 44**, Nelson discloses the second sensor is a process independent sensor (i.e., air gauge, para. 56).

39. Considering **claim 45**, Nelson discloses a memory unit configured to store at least one of the first and second characterizations (i.e., data storage, para. 78).

40. Considering **claim 46**, Nelson discloses a data storage medium including instructions describing a method of measurement (i.e., the apparatus can be controlled by a computer system and includes one or more processors that are connected to a communication bus or a memory, preferably a RAM and can also include a secondary memory, para. 78) to implement the method disclosed in the limitations set forth in claim 1 above.

Claim Rejections - 35 USC § 103

41. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

42. **Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson et al. (U.S. Publication No. 2002/0158185) in view of Queens et al. (U.S. Publication No. 2003/0218141).**

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43. Considering **claim 6**, Nelson fails to specifically disclose generating a second characterization occurs during the exposing.

However Queens discloses (para. 52) that it is well known in the art that generating a height map occurs during exposing.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to generate the height map during the exposure process as taught by Queens in the system of Nelson since it reduces time of processing the substrate.

Conclusion

44. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tara S. Pajoochi whose telephone number is (571)272-9785. The examiner can normally be reached on Monday - Thursday 9:00 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tarifur R. Chowdhury can be reached on 571-272-2287. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/TSP/

/TARIFUR CHOWDHURY/

Supervisory Patent Examiner, AU 2886